REMARKS

By the above amendment, claims 1-30, 34 and 38 are cancelled and claim 31 is amended. Accordingly, claim 31, as amended, and claims 32, 33 and 35-37 are pending.

Amendments to Specification

Paragraph 19 is amended to clarify the applicant's use of the term "stiffness" throughout the specification. It has recently come to the applicant's attention that use of the term "stiffness" in the application requires clarification. Although the applicant believes that one skilled in the art would readily understand, from the context of the applicant's usage of the term "stiffness", that the applicant is referring to the "modulus of elasticity" of the material, the applicant believes it is prudent to amend the application to provide clarity . Paragraph 19 has therefore been amended to clarify the applicant's usage of the term "stiffness" and to distinguish between axial bending stiffness and radial compression stiffness. All of this information is common general knowledge in the field and is submitted to not comprise new subject matter in respect of this application.

Paragraph 19 is also amended in the chart, to correct a typographic error in the stiffness of E-Glass, which is changed from "17.00" Msi to "7.00" Msi.

Paragraph 21 is amended in the last sentence to clarify that "stiffness" as referred to in the context of this paragraph is radial compression stiffness. The applicant submits that it would have been clear to one skilled in the art that the applicant was referring to radial compression stiffness and not modulus of elasticity, since a change in thickness of a material would not result in a change in the modulus of elasticity.

Paragraph 30 is cancelled, since it is a statement of invention which corresponds to cancelled Claim 1.

Paragraph 31(a) is amended in accordance with amendments made to Claim 31 and to paragraph 91 (see below).

Paragraph 72 is amended in the last sentence to clarify that "stiffness" as referred to in the context of this paragraph is radial compression stiffness. Again, the applicant submits that it would have been clear to one skilled in the art that the applicant was referring to radial compression stiffness and not modulus of elasticity, since a change in thickness of a material would not result in a change in the modulus of elasticity.

Paragraph 91 is amended on the second line to replace "axial stiffness" with "axial bending stiffness" and to correct the units for the figures provided. The applicant submits that one skilled in the art would have readily understood that the figures originally provided did not relate to axial modulus of elasticity, since, as shown in the chart provided in paragraph 19, the modulus of elasticity for composites is at least three orders of magnitude higher, given in Millions of pounds per square inch, not thousands of pounds per square inch. One skilled in the art would have

recognized that the numbers relate to axial bending stiffness. The typographic error in the units, which the applicant has now corrected, would also have been obvious to one skilled in the art.

Paragraph 91 is also amended on the fourth line to replace "radial stiffness" with "radial compression stiffness" and to correct an error in the magnitude of the figures and the units provided. The applicant submits that one skilled in the art would have readily understood that the figures originally provided relate to radial compression stiffness and not radial modulus of elasticity, since, as shown in the chart provided in paragraph 19, the modulus of elasticity for a composite is at least three orders of magnitude higher, given in Millions of pounds per square inch, not thousands. One skilled in the art would have recognized that the numbers relate to radial compression stiffness. The typographic error in the magnitude of the numbers, and the units, which the applicant has now corrected, would also have been obvious to one skilled in the art.

Paragraph 108 is amended on line 11, to clarify that "stiffness" as referred to in the context of this paragraph is radial compression stiffness. Again, the applicant submits that it would have been clear to one skilled in the art that the applicant was referring to radial compression stiffness and not modulus of elasticity, since a change in thickness of a material would not result in a change in the modulus of elasticity.

Claims 1-30

The applicant cancelled claims 1-30, 34 and 38. Accordingly, any objections based thereon are now moot.

Independent Claims 31 and 35

The Examiner has rejected claims 31 and 35 as being obvious over by U.S. Patent Application No. 2002/0198071 to Snow ("Snow") in view of U.S. Patent No. 6,776,735 to Belanger et al. ("Belanger"). The applicant traverses this rejection for the following reasons:

Claim 31 describes a bat having a cylindrical tubular hollow void barrel portion, constructed solely of a polymer composite material comprising a thermoset resin and continuous length reinforcement fibers, where the absolute values of all the resultant fiber angles in the handle portion are arranged to be less than an average of the absolute values of all the resultant fiber angles in the barrel portion, thereby providing the handle portion with an axial stiffness that is greater than the axial stiffness of the barrel portion, and wherein the axial bending stiffness of the handle portion is between 50,000 lb-in^2 and 250,000 lb-in^2, and the radial compression stiffness of the barrel portion is between 70 lb/in and 350 lb/in.

Claim 35 describes a bat having a cylindrical tubular hollow void barrel portion, constructed solely of a polymer composite material comprising a thermoset resin and continuous length reinforcement fibers, where the absolute values of all the resultant fiber angles in the handle portion are arranged to be less than an average of the absolute values of all the resultant fiber angles in the barrel portion, thereby providing the handle portion with an axial stiffness that is

greater than the axial stiffness of the barrel portion, and wherein the first bending mode frequency of the handle portion is between 100 and 600 hertz, and the hoop frequency of said barrel portion is between 800 and 2000 hertz.

As thus described, the applicant's bat is submitted to patentable distinguish over the combination provided by Snow and Belanger.

In particular, neither Snow nor Belanger provide any teaching of the resultant properties of the bat handle, namely axial bending stiffness or bending mode frequency, or the bat barrel, namely radial compression stiffness or hoop frequency, as claimed herein by the applicant. That is, neither Snow nor Belanger provide any teaching or any suggestion that they have any awareness of the resultant dimensional parameters of the bats they describe.

Belanger teaches overwinding wooden core baseball bats with layers of fiberglass composite wherein the fiber angles in the handle are less than in the barrel. To one skilled in the art of overwinding it would be obvious that the fiber angles shown by Belanger are the natural result of this overwinding process as opposed a deliberate inventive intent or objective. This is clear from Belanger's complete lack of teaching as to the purpose for varying the fiber angles or what effect such variation has on bat properties, such as axial bending stiffness, bending mode frequency, radial compression stiffness or hoop frequency. The purpose of the invention described by Belanger is to mimic the appearance, performance and sound of an all wood bat and to provide an all wood bat that is more durable.

Belanger's bat is solid, comprised of wood with outer layers of fibreglass composite. The applicant has shown in the attached engineering calculations, that thin layers of fibreglass composite on a solid wood core have little effect on the bending stiffness (EI) of the handle (chart 1) or barrel (chart 3) (see relative bending stiffness in last column). This is due to the fact that a solid wood bat already has such high axial bending stiffness, that a thin layer of polymer composite makes very little difference in this property. Therefore, Belanger simply does not teach and could not have been aware, that changing fiber angles between the bat handle and the bat barrel would result in changing the relative stiffness of the handle compared to the barrel, or that it would have any effect on axial bending stiffness or bending mode frequency of a hollow bat comprised solely of polymer composite material as claimed herein by the applicant.

Since the Belanger bat is solid wood, its radial compression stiffness is already extremely high, being many orders of magnitude above that for a hollow composite bat, as shown in chart 3 of the attached engineering calculations. Adding a thin layer of composite of the wood has no significant effect on this property. Further, a solid bat can not physically exhibit a hoop frequency. Therefore, the applicant submits that the lower fiber angles described by Belanger in the handle relative to the barrel, do not, and could not provide any teaching of the effect this would have on the radial compression stiffness or the hoop frequency of the barrel of a hollow bat comprised solely of polymer composite material as described by Snow or as claimed herein by the applicant.

Snow describes a first generation hollow all composite bat. However, Snow provides no teaching and shows now knowledge or appreciation of the properties of stiffness and frequency

required to optimize feel and performance of the bat as claimed by the applicant herein. Accordingly, there would have been no motivation for the skilled technician in the field to apply the relatively different fiber angles between the handle and barrel taught by Belanger to the bat of Snow to result in the bat claimed herein by the applicant having the particular properties of axial bending stiffness and bending mode frequency in the handle, and radial compression stiffness and hoop frequency in the barrel.

In summary, neither Snow nor Belanger had any appreciation or understanding that the properties of stiffness and frequency could be controlled by varying fibre angles between the handle and barrel or that varying such fiber angles was useful to optimize bat performance and feel as taught herein by the applicant. The applicant, if requested by the examiner, can provide proprietary test data clearly showing that bat performance increases as hoop frequency decreases - an unanticipated result.

The law is clear "[A]n accidental and unappreciated duplication of an invention does not defeat the patent right of one who, though later in time, was the first to recognize that which constitutes the inventive subject matter." (**Silvestri v. Grant**, 496 F. 2d 593, 597 (CCDA 1974), as quoted by the United States Court of Appeals for the Federal Circuit in Invitrogen Corporation v. Clontech Laboratories Inc., decided November 8, 2005: http://fedcir.gov/opinions/04-1039.pdf).

Another relevant case is that of **In re Antonie**, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). In this case, the claimed inventive wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the volume to contractor ratio. Therefore the Court held that the parameter being optimized by the applicant was not recognized in the prior art as being a result-effective variable. Accordingly, the court ruled that absent such recognition, a reference cannot be used as the basis for an obviousness rejection directed to the critical parameter.

Moreover, there is a burden on the Examiner to raise a *prima facia* case when asserting obviousness over a cited reference. Where the reference does not recognize that a relative variation in a parameter has a controlling effect on the variable characteristics identified and claimed by the applicant, no *prima facia* case of obviousness is established when the subsequent applicant presents claims directed to relative variations in that parameter for controlling the characteristics identified.

On page 2 of the Office Action of November 8, 2005, the Examiner states that:

> "... as disclosed by Belanger it is known in the art to vary the fiber angle depending on the area of the bat. Varying such allows the ordinary skilled artisan to control the flexibility, tensile, or hoop strength in a particular portion of the bat."

However, as pointed out by the applicant above, there is no teaching by either Snow or Belanger that varying such fiber angles would or could have any effect on flexibility, tensile or hoop strength, since Belanger was working with a solid wood bat wherein these properties were insignificantly affected by the added polymer composite layer.

Accordingly, claims 31 and 35, and the claims that depend therefrom are submitted to patentably distinguish over Snow in combination with Belanger, and the Examiner is requested to withdraw his objection and allow these claims.

Respectfully submitted,

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